

REMARKS

The Office Action indicated that the subject matter of Claim 8 would be allowed if rewritten in independent form. It is respectfully requested that this allowed subject matter be held in abeyance until the following comments are considered.

The present invention is in the field of compact self-ballasted fluorescent lamps that can provide an energy-saving feature while replacing incandescent lights. The base of the lamp of the present invention can be inserted within an electrical socket that receives a conventional incandescent light. As can be readily appreciated, the issue of saving energy is extremely important and a number of large companies with highly skilled engineers and scientists are constantly looking for improvements in this field. Thus, in determining the merits of an invention, the crowded nature of this field should be carefully considered.

The present invention addresses rising characteristics that can significantly deteriorate over the expected lifecycle of the lamp. The present inventors have performed tests as set forth on Page 19, Line 16 through Page 20, Line 21, wherein the rising characteristics experienced significant improvement, for example, 9.5 seconds after 6,000 hours of total lighting time compared to 20.5 seconds for a conventional fluorescent lamp.

The inventors further conducted tests as to the exhaustion of amount of mercury that was enclosed in the arc tube between the conventional lamp and the present invention. In the present invention, the analytical result indicated that 20 to 30 percent of the mercury enclosed in the arc tube sputtered and evaporated and further reacted with electron emissive material adhered to the inner surface of the glass to form one type of amalgam. With a comparison of the conventional lamp, it was found that 50 to 70 percent of the mercury enclosed in the arc tube had formed an amalgam. See Page 20, Line 22 through Page 21, Line 14.

Further investigation indicated that when the lamp is turned off, the temperature in the vicinity of the blackened material adjacent the electrode position was maintained at a higher temperature for a longer period of time than that of a conventional lamp. Since mercury has a property of gathering towards a lower temperature position, it is believed that by maintaining the temperature of the blacking material on the inner surface of the glass tube at a higher temperature for a longer period of time, that the mercury within the glass tube had not gathered around the blackened material and the reaction between the blackened material and the mercury was reduced or suppressed. Thus, the present invention is an attempt to maintain the rising characteristics not only at the initial use of the lamp, but throughout the life of the lamp by actually designing our lamp to hold heat adjacent the filaments within a balanced tradeoff of the wall load that could be imposed on the glass tubing.

The present inventors also noted that increasing the mercury could also assist with regards to the rising characteristic. However, the pollution factor and the additional costs associated with increased mercury, is counterproductive.

Referring to Claim 1, we define a fluorescent lamp with a holder having a pair of insertion openings holding the arc tube by fixing the ends of the glass tube wherein the filament coil in each of the glass tubes are also inserted within the holder and thereby raise the temperature of the inner surface of the glass tube adjacent the filament. With this design, there will be less mercury reduction and amalgam formation.

Thus, the present invention represents an innovative analysis and solution in providing an improvement in the raising characteristics of a compact fluorescent lamp over its service life.

Newly drafted Claim 11 provides an alternative definition of the present invention.

The Office Action rejected Claims 1, 4, 6, and 9 as being unpatentable under 35 USC §103 over the *Soules et al* US Patent No. 5,705,883. The *Soules et al* reference was cited for the basic structure of a compact self-ballasted fluorescent lamp and more particularly for purportedly disclosing in it's abstract that the ends of the glass tube would be inserted to such a position that "each filament coil would be positioned within a holder" to allegedly provide heat transfer benefits. Applicant respectfully traverses this interpretation since it is clear that the *Soules et al* reference actually teaches away from the present invention and the quotation from the abstract is taken out of context because the improved heat transfer benefit is to shield the ballast components from a transfer of heat and to lower the temperature of the lamp wall at the base as noted at Column 2, Lines 58-60.

The principal design efforts in the *Soules et al* reference was to reduce the height of the low pressure discharge lamp. As noted in Column 2, Lines 7-18, the heating electrodes in the discharge tube were actually a problem in that they could damage the plastic housing supporting the compact fluorescent lamp and the electrodes were a primary source of heat transmitted to the ballast electronic components.

Referring again to the Abstract, it does not support any interpretation of "each filament coil to be positioned within the holder so as to give heat transfer benefits." This statement is referring to the glass tube with the position of the electrodes located away from the base. Thus, the Abstract is not referring to any equivalent holder relationship to cover electrodes as defined in our claims.

Referring to Figure 2, the actual position of the *Soules et al*'s electrodes 82 and 84 are disclosed as being positioned exterior and outwardly from the walls of the base or holder in which the end of the tubes are mounted. See Column 5, Lines 16-23 as follows:

"As is also represented in FIG. 2, electrodes 82, 84 are spaced outwardly from the walls 72, 74 of the base. This is the region of highest temperature associated with the discharge lamp. Since the base is often formed of a plastic material, it is desirable to maximize the distance of the electrodes from the housing and provide sufficient heat sinking to provide good heat exchange with the external environment."

Thus, as can be determined by positioning the electrodes 82 and 84 outward, there is an attempt to use the ambient air as the external environment for heat exchange purposes, thereby permitting the heat to be dissipated from the glass tubes. Thus, the design choice is to position electrodes near the leg bend, which is where the tube starts being oriented perpendicular to the axis of the lamp, as shown in Figures 2 and 3.

This positioning of the electrodes 82 and 84 exterior of the ballast housing or housing to receive the ends of the glass tubes, is repeated in each of the alternative embodiments as can be seen in Figures 5, 8 and 10.

Accordingly, there has been a misinterpretation of the statement in the Abstract since each of the four separate embodiments clearly disclose that the purpose of the present *Soules et al* teaching is to position the respective electrodes 82 and 84 exterior to the vertical walls or plates 72 and 74 that are the upper portion of the ballast housing.

As can be appreciated, our present invention specifically locates the filament coils or electrodes within our holding member 210 as shown in each of the embodiments of our present invention, see for example Figures 5 and 6.

It is respectfully submitted that our claims define a change that would specifically teach away from the *Soules et al* reference, and accordingly, would not be obvious under 35 U.S.C. §103.

[I]t is generally settled that the change in prior art device which makes the device inoperable for its intended purpose cannot be considered to be an obvious change.

Hughes Aircraft Co. v. United States, 215 U.S.P.Q. 787, (Ct.Cl. Trial Div. 1982)

Claim 2 was held to be unpatentable over a combination of the *Soules et al* reference in view of the *Skwirut et al* (U.S. Patent No. 4,871,944). The *Skwirut et al* reference, however, was cited for the use of mercury and a glass tube diameter. *Skwirut et al* does not resolve the deficiency of placing the electrodes or filament coils specifically within a housing to resolve a rising characteristic in a compact fluorescent lamp.

Claims 3 and 10 were further rejected over *Soules et al* in view of the *Vrionis* (U.S. Patent No. 5,581,157). The *Vrionis* reference was cited for features of the holding member unrelated to the positioning of the filament coils.

Finally, Claims 5 and 7 were rejected over the *Soules et al* reference in view of the *Arakawa et al* (U.S. Patent Publication 2002/0158567). More specifically, *Arakawa et al* was cited to disclose a quantity of mercury to be used as a luminous material. Again, the *Arakawa* reference does not resolve the deficiency in the basic *Soules et al* teaching. In fact, the *Arakawa* reference relates to an electrodeless type compact self ballast fluorescent lamp.

Our claims define the positioning of the filament coils within a holder which is clearly different from any combination of teachings, including the *Soules et al* reference which suggests that the electrodes should be positioned outside the holder.

It is respectfully submitted that our solution to the problem of a raising characteristic over the life of the lamp is counter to the common knowledge of the person skilled in this field since it is known that heat can decrease the light quantity.

Our present invention as defined in Claim 1 sets forth a range, as supported on Page 23 of our specification, which is neither taught nor appreciated by any of the references of record. We have provided an improvement in the raising characteristics of the light startup which is not discussed, mentioned or recognized by the *Soules et al* reference, and this can be achieved while suppressing a decrease in light quantity over the life of the lamp.

According to the present invention, which relates to an electrode or filament-type lamp, an electron emissive material of a filament coil evaporates due to the lighting effect and can adhere to the inner surface of the arc tube. Mercury reacts with this adhering material and is reduced and accordingly consumed. Electrodeless type lamps such as disclosed in the *Arakawa et al* reference, would not experience a similar mercury consumption and accordingly, would not suggest the advantages of the present invention.

Referring to newly drafted Claim 11, the position of the holder and the electrodes in the arc tube is defined wherein the filament coils are positioned within the holder and operatively retain a larger amount of heat from the filament to elevate the temperature of an inner surface of the glass tube within the holder when compared to an inner surface of the glass tube adjacent an exterior of the holder. As a result of this innovative feature and structural relationship between the filament coils and the holder, any reduction in mercury over the life of the fluorescent lamp is reduced and the raising characteristics of a start time is decreased.

None of the references of record alone or in combination recognize these problems nor offer the present solution.

Accordingly, it is believed that the present invention is allowable and early notification of the same is requested.

If the Examiner believes a telephone interview will further the prosecution, the undersigned attorney can be reached at the listed phone number.

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on December 28, 2005.

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Signature

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Very truly yours,

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